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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,574	02/24/2004	Robert D. Maple	DP-310126	9886

7590 02/27/2007

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EXAMINER	
TRAN, VINCENT HUY	
ART UNIT	PAPER NUMBER
2115	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/785,574	MAPLE ET AL.	
	Examiner	Art Unit	
	Vincent T. Tran	2115	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-15 and 17-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-15 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the communication filed on 1/03/2007

2. Claims 1-3, 5-15, 17-19 are pending for examination.

3. The text of those sections of Title 35, U.S. code not included in this action can be found in a prior Office action.

Response to Arguments

4. Applicant's arguments with respect to claim 1-3, 5-15, 17-19 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

5. Claim 5 is objected to because of the following informalities: Claim 5 is depended on a Cancelled claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 5-6, 12-14, 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kajouke et al. U.S. Patent No. 6,166,934 ("Kajouke").

8. As per claim 1, Kajouke discloses a device, comprising:

a power source [11 fig. 1] and a load [31 fig. 1]; and

a power converter unit [30 fig. 1] including a processor [27 fig. 1] and a plurality of converter modules [23-1..23-N fig. 1], wherein the processor dynamically optimized the power converter unit to maximize the efficiency of the transfer of energy form the power source to the load [col. 1 line 65 to col. 2 line 5; col. 3 lines 55-61; claim 1].

9. As per claim 2, Kajouke discloses the power converter unit is a two phase DC/DC hard switch converter [col. 1 lines 15-16].

10. As per claim 5, Kajouke discloses the processor includes a software based program that monitors, calculates, and compares varying dynamic parameters that affects the efficiency of the power converter supplying energy to the load [inherent since the Kajouke's system comprises a smart controller operable to sense and detect the load demand and to enable the appropriate number of converter modules, accordingly-col. 4 lines 34-57; col. 5 lines 20-30].

11. As per claim 6, Kajouke discloses the device further comprises a lookup table stored internal or external to the microprocessor, wherein the lookup table includes pre-programmed or dynamically created information based upon the monitored parameter [inherent as show in col. 3 lines 55-60, the system would be inoperable if the device does not included a pre-programmed lookup table to allow the smart controller to determine and switch on the appropriated number of converter modules.]

12. As per claim 12, Kajouke discloses a method comprising the steps of:

dynamically optimizing a power converter unit including a processor [27 fig. 1] and a plurality of modules [23-1...23-N fig. 1];

monitoring and comparing output power in view of an operating system power level to determine the number of modules to be activated to provide maximum efficiency; and

maximizing efficiency of the power converter supplying energy to a load [col. 2 lines 2-32].

13. As per claim 13 and 14, see discussion in claim 5 and 6.

14. As per claim 17, Kajouke discloses the steps of adjusting frequency of the device to provide maximum efficiency [col. 5 lines 7-20].

15. As per claim 18, see discussion in claim 10.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

18. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kajouke as applied to claim 1,2 above, and further in view of Jacobs et al. U.S. Patent No. 6,396,725.

20. As per claim 3, Although Kajouke teaches a DC-to-DC converter, Kajouke does not explicitly teach the converter unit is selected from the group consisting of buck converters, boost converter, buck-boost converter, fly-back converters, forward converters, and push-pull converters, half bridge converters, full bridge converter.

However this feature is an old and well know in the art of power converter topology as teach by Jacobs, where Jacobs teaches another method relates to the optimization of a DC-to-DC converter. Specifically, Jacobs teaches the DC-to-DC converter may employ any conventional topology lap known to those skilled in the pertinent art, including buck, boost and buck converter [col. 5 lines 40-45].

Therefore, it is obvious to one of ordinary skill in the art to have modified the system of Kajouke with the well know converter as teach by Jacobs to obtain the invention as specified in claim 3.

21. Claims 7-8, 10, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajouke as applied to claim 1, 5 or 12, above, and further in view of Jacobs U.S. Patent No. 6,351,396 ("M Jacobs").

22. As per claim 7, 15, Although Kajouke teaches the processor (smart controller) calculates efficiency by provides a smart decision to switch in or out a specific number of the converter modules at a given operating load; Kajouke does not teach the processor calculates efficiency by receiving the average input and output voltage from input and output voltage sensors and average input and output current from input current sensors to calculates input and output power.

M Jacobs teaches another method directed to electrical power supplies, and especially to the method of dynamically adjusting operation of a converter device to improve conversion efficiency. Specifically, M Jacobs teaches the most direct and well know approach to optimizing efficiency of a converter is using a processor to receive the average input and output voltage from input and output voltage sensors and average input and output current from input current sensors to calculate input and output power [col. 1 lines 39-46].

Therefore, it is obvious to one of ordinary skill in the art to have modified the system of Kajouke with the well know method as teach by M Jacobs to obtain the invention as specified in claim 7.

23. As per claim 8, Kajouke teaches the processor monitors and the compares output power in view of an operating system power level to determined the number of modules to be activated to provide maximum efficiency [col. 3 lines 55-61; col. 4 lines 34-57].

24. As per claim 10, Kajouke teaches the processor monitors temperature in each module and continuously adjusts duty cycle until temperatures in each module are the same [inherent as show in col. 4 lines 58-60 – the controller provides current sharing and thermal balance among active converter modules].

25. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kajouke and M Jacobs as applied to claim 1, 5 , 7 above, and further in view of Telefus.

26. As per claim 9, Kajouke does not explicitly teach the processor adjusts frequency of device to provide maximum efficiency. Telefus teaches another self-compensating switching power converter. Specifically, Telefus teaches the processor [pulse optimizer, col. 4 line 60] adjusts frequency of device to provide maximum efficiency [col. 4 lines 30-38; from col. 4 line 52 to col. 5 line 11].

At the time of the invention was made it would have been obvious to one of ordinary skill in the art to have modified to system of Kajouke and M Jacobs with the adjustment of frequency of Telefus to optimize the performance of the power converter [col. 3 lines 11-14].

27. Claims 11, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajouke and M Jacobs as applied to claim 1, 5, 7 or 12 above, and further in view of Lethellier US. 20030214274.

28. As per claim 11, Although Kajouke teaches a controller operable to provide current sharing and thermal balance between active converter module, Kajouke does not explicitly teach

the processor continuously adjusts duty cycle of the system until the currents in each module are the same.

Lethellier teaches another method relates to a switched mode DC-to-DC power converters wherein, for certain application having especially demanding current load requirements, it is known to combine plurality synchronous buck converter together in multi-phase configuration operated in an interleaf mode such that the output inductors of each of the multiple channels are connected together to provide a single output voltage [paragraph 0005]. Specifically, Lethellier teaches a controller monitors the output currents of the modules and continuously adjusts duty cycle of the system until the current in each module are the same [paragraph 0006].

At the time of the invention was made, it would have been obvious to modified the system of Kajouke and M Jacobs with the method taught by Lethellier in order to reduce the stress on individual components of the power converter [paragraph 0005].

Conclusion

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Examiner's note:

Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

Prior Art not relied upon:

Please refer to the references listed in attached PTO-892, which, are not relied upon for claim rejection since these references are relevant to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent T. Tran whose telephone number is (571) 272-7210. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas c. Lee can be reached on (57 1)272-3667. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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